

Confirmation No. 3317

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	DETECHEVERRY	Examiner:	Baisa, Joselito
Serial No.:	10/564,582	Group Art Unit:	2832
Filed:	January 12, 2006	Docket No.:	NL030878US (NXPS.267PA)
Title:	INDUCTIVE AND CAPACITIVE ELEMENTS FOR SEMICONDUCTOR TECHNOLOGIES WITH MINIMUM PATTERN DENSITY REQUIREMENTS		

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**REPLY BRIEF**

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Customer No. <b>65913</b>
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Dear Sir:

This is a Reply Brief submitted pursuant to 37 C.F.R. § 41.41(a)(1) for the above-referenced patent application. This Reply Brief is submitted in response to the Examiner's Answer dated April 1, 2010, and in further response to the Final Office Action dated July 22, 2009.

Only if required, authorization is given to charge/credit Deposit Account 50-4019 (NL030878US) any requisite fees/overages to enter this paper.

**I. Status of Claims**

Claims 1-22 stand rejected and are presented for appeal.

**II. Grounds of Rejection**

The grounds of rejection to be reviewed on appeal are as follows:

- A. Claims 1-3, 5-7, 9 and 11-22 stand rejected under 35 U.S.C. § 103(a) over Ballantine (U.S. Patent No. 6,489,663) in view of Minami (U.S. Patent No. 6,730,983).
- B. Claims 4, 8 and 10 stand rejected under 35 U.S.C. § 103(a) over the '663 reference in view of the '983 reference and further in view of Kuroda (U.S. Patent No. 6,693,315).

**III. Appellant's Reply Argument**

Appellant notes that the Examiner's Answer has failed to address Appellant's arguments in Sections A(2) and B of Appellant's Appeal Brief, respectively regarding the teaching away/lack of motivation as applicable to all claim rejections, and the impropriety of the rejection of claims 4, 8 and 10. In view of Appellant's (uncontroverted) arguments, all rejections are improper in the record as it stands.

Each of the § 103(a) rejections, all of which rely upon the combination of the '663 and '983 references, also fails to provide correspondence to multiple claim limitations including those in the independent claims (1 and 22) directed to tilling structures that are positioned in a geometrical arrangement that works to inhibit the inducement of current in the tilling structures. Appellant explicitly addressed this lack of correspondence in its Appeal Brief. The Examiner's Answer has not addressed all traversals as required, particularly those explaining that the cited vias do not inhibit current in accordance with the claimed invention. Accordingly, the record (as it stands) cannot support the § 103(a) rejections.

Appellant further notes that the Examiner's Answer offers new grounds of rejection at page 9, in citing to column 5 of the '663 reference in now asserting that cited tilling structures are coupled to a ground strip. Appellant submits that these new grounds are improper, yet notes that the rejections should nonetheless be reversed for lack of correspondence as discussed above. The following addresses these matters in greater detail.

1. **The Cited Vias Do Not Correspond To Tilling Structures Geometrically Arranged To Substantially Inhibit The Inducement Of Image Current Therein.**

As established in Appellant's Appeal Brief, the cited references do not teach a plurality of tilling structures arranged in a geometrical pattern to substantially inhibit the inducement of an image current therein, and nothing in the record supports the Examiner's assertions regarding the alleged operation of unrelated structures in the cited references. In its Appeal Brief, Appellant argued that the '663 reference does not teach that vias 28 (*i.e.*, the asserted tilling structures) are arranged to substantially inhibit the inducement of an image current in the vias 28 by a current in inductor 16 (*i.e.*, the asserted inductive element). Instead, the '663 reference arranges the vias 28 to terminate the electric field lines emanating from inductor 16 and to decrease the parasitic capacitance present between inductor 16 and ground strips 26. *See, e.g.*, Figure 1 and Col. 5:40-45. Appellant notes that the discussion in the '663 reference relating to preventing the flow of an image current is directed to preventing the flow of an image current in the ground strips 26 (*see, e.g.*, Col. 3:38-41, Col. 4:39-42 and Col. 6:59-62). Thus, the '663 reference does not teach arranging the vias 28 to prevent the flow of an image current in the vias 28.

The Examiner's Answer asserts that the perpendicular arrangement of vias 28 on rows of ground strips 26 in the '663 reference "efficiently places conducting vias in a position to intercept and terminate the electric field emanating from spiral inductor 16" and further that the "ground plane is cut into a plurality of ground strips in order to prevent the flow of image current that would be induced in a solid ground plane...." The Examiner's Answer goes on to assert that "column 2 of Ballantine [the '663 reference] further discloses about elimination of image current caused by inductors in (sic) semiconductor device."

In reply, Appellant submits that, while the cited vias "intercept" as suggested by the Examiner, these vias are not geometrically arranged to inhibit the inducement of current as nothing in the cited references or in the Office Action teaches any such geometrical arrangement that would inhibit the inducement of current. Importantly, not only are the cited vias not geometrically arranged as in the claimed invention, the ground strips and vias are arranged such that they actually *receive* induced current, as the ground strips are cut to ensure that this induced current does not flow ("to prevent the flow of image current" as cited by the Examiner). *See*, for example, column 6:59-64 in the '663 reference. This is consistent with the Examiner's own indications in the Final Office Action, in suggesting that "[t]he current is directed to the grounding strip [Col. 6, Lines 59-64]." *See* page 8 of the Final Office Action. This field

termination alleged in the Examiner's answer thus does not involve the inhibition of current in the vias themselves, but rather the termination of a field in a surrounding substrate. This is accomplished by effectively forming a "Faraday cage" (*see, e.g.,* the Abstract), to block electric fields. As is well known, such devices actually operate by generating a current within the conductor (vias) that rearranges charges to terminate such an electric field. Accordingly, the relied upon portions of the '663 reference (*e.g.,* Col. 6:59-64) do not involve the mitigation of induced current in the vias, but rather preventing the flow of induced current in the ground strips connected to the vias.

Appellant further notes that the secondary '983 reference is not alleged by the Examiner and in fact does not address the above discussed deficiencies of the primary '663 reference. For example, the '983 reference does not teach or suggest that dummy elements 12 are arranged to prevent the inducement of an image current in the dummy elements 12.

Accordingly, not only do the cited references fail to disclose tilling structures (or even vias) having a geometrical arrangement that inhibits the inducement of current therein, the asserted vias actually receive induced current and present the induced current to the ground plane. Appellant therefore submits that the '663 reference (as combined) fails to provide correspondence to each of independent claims 1 and 22, and therefore to dependent claims 2-21 as well. Appellant therefore requests that the § 103(a) rejection of claims 1-3, 5-7, 9 and 11-22 is improper and Appellant requests that it be reversed.

**2. The § 103(a) Rejection Of Claims 1-3, 5-7, 9 And 11-22 Is Improper As The '663 Reference Teaches Away From The Proposed Combination.**

As discussed above, the Examiner's Answer failed to address Appellant's argument as presented in Section A(2) of the Appeal Brief, regarding this teaching away and related lack of motivation/frustration of purpose. Arguments regarding these same issues were similarly ignored in Appellant's Response to the Final Office Action. Appellant submits that the record has not supported the rejections, and requests that the rejections be removed. For convenience, Appellant has summarized relevant traversals below.

As consistent with the above discussion in Section 1, the '663 reference uses its vias as a "Faraday cage" to conduct current to a ground plane, which contradicts and teaches away from the Examiner's proposed combination "to intercept and terminate the electric field" as indicated

at page 9 of the Examiner's Answer. Consistent with the recent *KSR* decision, M.P.E.P. § 2143.01 explains the long-standing principle that a §103 rejection cannot be maintained when the asserted modification undermines either the operation or the purpose of the main ('663) reference - the rationale being that the prior art teaches away from such a modification.<sup>1</sup> Accordingly, modifying the '663 reference to substantially inhibit the induction of current in the cited vias would directly contradict the stated purpose of the '663 reference involving the intercepting and terminating of an electric field, and is therefore improper.

The '663 reference further teaches away from the proposed modification combination of references, which would effectively connect the vias 28 to the substrate 12 as shown in Figure 1 of the '663 reference, because the cited dummy elements (12) in the '983 reference are electrically connected to substrate 1 (*see* Figure 2 of the '983 reference). More specifically, modifying the vias 28 as asserted would result in high frequency-energy passing through the vias 28 into substrate 12 (as taught by the '983 reference at Col. 2:26-28), thereby increasing coupling between the substrate 12 and the inductor 16 relative to the unmodified vias 28 of the '663 reference. However, the '663 reference involves isolating the inductor 16 and vias 28 from the substrate 12 (*see, e.g.*, Figure 1 and Col. 4:52-64 of the '663 reference). The Examiner's proposed modification of the '663 reference would therefore render the '663 reference unsatisfactory for its intended purpose of preventing coupling between the substrate 12 and the inductor 16 (*e.g.*, by preventing the electric field lines generated by the inductor from penetrating into the substrate). *See, e.g.*, Col. 3:62-67. Accordingly, the '663 reference teaches away from the Examiner's proposed modification and there would be no motivation for the skilled artisan to modify the '663 reference in such a manner.

In view of the above, the § 103(a) rejection of claims 1-3, 5-7, 9 and 11-22 is improper and Appellant requests that it be reversed.

**3. The § 103(a) Rejection Of Claims 6 And 7 Is Improper Because The Combination of References Fails To Teach A Structure That Does Not Block The Penetration Of An Electric Field Into A Substrate.**

The cited references do not teach a geometrical pattern of tiling structures that does *not* substantially inhibit inductive coupling between the inductive element and the substrate (*see* claim 6). It appears that the Examiner has missed the limitation "not" relative to blocking

<sup>1</sup> *See KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398 (U.S. 2007) ("[W]hen the prior art teaches away from combining certain known elements, discovery of a successful means of combining them is more likely to be non-obvious.")

penetration, as the Examiner's Answer actually supports the Appellant's position in reciting that "the vias 28 intercepts or blocks (sic) the electric field emanating from inductor 16 to avoid penetration into the substrate 12."

More specifically, the '663 reference explains that its vias 28 (*i.e.*, the asserted tilling structures) are effectively placed "in a position to intercept and terminate the electric field emanating from spiral inductor 16." Col. 5:14-16. The '663 reference expressly teaches that the disclosed arrangement of ground strips 26 and vias 28 replaces ground plane 22, with the disclosed arrangement performing the function of the ground plane (*e.g.*, to block the electric field emanating from the inductor and to inhibit inductive coupling between the inductor and the substrate). *See, e.g.*, Figure 1 and Col. 6:56-67. Thus, the '663 reference expressly teaches that the vias 28 actually block the penetration of electric field lines from inductor 16 to substrate 12. This is further consistent with the Examiner's Answer.

Accordingly, as established in Appellant's Appeal Brief and affirmed in the Examiner's Answer, the '663 reference (as combined) fails to correspond to claim limitations directed to not blocking inductive coupling. The § 103(a) rejection of claims 6 and 7 is therefore improper and Appellant requests that it be reversed.

**4. The § 103(a) Rejection Of Claims 17-19 Is Improper Because The Cited References Fail To Disclose A Device That Includes A Capacitive Element With Capacitor Electrodes As Claimed.**

As discussed above in Section 1, the rejection of claim 1 (from which claims 17-19 depend) is improper due to lack of correspondence to tilling structures that inhibit the induction of current therein. Accordingly, the rejections of claims 17-19 are improper as well.

The rejections of claims 17-19 are also improper because the cited combination of references does not teach using capacitor electrodes as a tilling structure (to mitigate the induction of current therein) and or as part of a ground shield as in the claimed invention. For example, as specifically relevant to claim 19, the '663 reference does not teach that the cited vias 28 (*i.e.*, the asserted tilling structures) and ground strips 26 (*i.e.*, the asserted ground shield) form capacitor electrodes of a capacitive element as asserted by the Examiner. Instead, the '663 reference teaches that the vias 28 decrease the parasitic capacitance present between inductor 16 and ground strips 26. *See, e.g.*, Figure 1 and Col. 5:40-45. This is consistent with the explanation in the '663 reference itself, which states that "[i]n the preferred embodiment shown,

the conducting vias are shown terminating between and slightly below the wires of the inductor because that is the configuration that most effectively keeps the capacitance down.” Col. 4:65 to Col. 5:1. Thus, the ‘663 reference uses vias 28 to prevent the IC 200 from functioning as a capacitor between inductor 16 and ground strips 26.

The Examiner’s Answer appears to attempt to address Appellant’s traversals by asserting that the vias have a capacitance (see page 12). However, this assertion stops short of establishing that the vias are a capacitor electrode (*e.g.*, as in claim 17), or that the combined vias and ground plane are respective capacitor electrodes of a capacitive element (*e.g.*, as in claim 119). Accordingly, the Examiner’s proposed combination does not correspond to the claimed invention. The § 103(a) rejection of claims 17-19 is therefore improper and Appellant requests that it be reversed.

**5. The § 103(a) Rejection Of Claims 4, 8 and 10 Is Improper Because The Cited Combination Of References Does Not Correspond, And The ‘663 Reference Further Teaches Away From The Proposed Combination.**

As discussed above, the Examiner’s Answer failed to address Appellant’s argument as presented in Section B of the Appeal Brief, regarding the lack of correspondence, the teaching away and related lack of motivation/frustration of purpose in regard to the rejections of claims 4, 8 and 10. Appellant submits that the record has not supported the rejections, and requests that the rejections be removed. For convenience, Appellant has summarized relevant traversals below.

The § 103(a) rejection of claims 4, 8 and 10 is improper because the cited combination of the ‘663 and ‘983 references does not correspond to the claimed invention as discussed above in Section 1, and further because the ‘663 reference teaches away from the Examiner’s proposed combination as discussed above under Section 2. Appellant further submits that the proposed combination of references fails to establish correspondence to the claimed invention, as the Examiner has not alleged that the tertiary ‘315 reference addresses the deficiencies of the cited combination of the ‘663 and ‘983 references as discussed above. The claims at issue are directed to limitations including those involving arrangements that facilitate the mitigation of inducted current. The cited portions of the ‘315 reference, alleged as corresponding to the claimed invention, fails to either correspond to or contemplate aspects of the claimed invention directed to such mitigation. Instead, the rejection only generally relies upon the ‘315 reference in

asserting at page 7 of the Final Office Action that the '315 reference discloses structures that "can be of any shape." This assertion fails to provide correspondence to the specific shapes as claimed, which inhibit the induction of current therein. These general averments are insufficient for maintaining a rejection under § 103(a). Appellant therefore requests that the § 103(a) rejection of claims 4, 8 and 10 be reversed.

#### IV. Conclusion

In view of the above and the underlying Appeal Brief, Appellant submits that the rejections of claims 1-22 are improper and therefore requests reversal of the rejections as applied to the appealed claims and allowance of the entire application.

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